REMARKS/ARGUMENTS

Prior to the Office Action, claims 1-39 were pending. Within the Office Action, claims 1-30 were rejected and claims 31-39 were withdrawn from consideration by the examiner, accordingly claims 1-39 are currently pending in this application.

I. Election of Species

The Office Action contained a requirement under 35 U.S.C. 121 for restriction to one of invention I, including claims 1-30 and drawn to an apparatus for use in a system for supercritical processing of an objects and invention II, including claims 31-39 and drawn to a method of regulating a flow of a processing chemistry into a system for supercritical processing of an object. The Applicants elect invention I without traverse.

II. Rejections

A. Rejections over U.S. Patents No. 6,612,317 and 6,874,513

Within the Office Action, the principal references relied upon are U.S. Patent No. 6,612,317 to Constantini et al. ("Constantini") and U.S. Patent No. 6,874,513 to Yamagata et al. ("Yamagata"). For the reasons fully outlined below, the Applicants respectfully traverse the rejections made within the Office Action and submit that the claims as presented above are in condition for allowance over Constantini and Yamagata.

Constantini

The cited portion of Constantini describes a system for supercritical processing that includes a process chamber (37) and provides for "steady-state operation of fluid flow and byproducts recovery while the process chamber is brought rapidly and repeatedly on and off line as in batch operations and for various process steps." [Abstract.] The system includes two check valves (67, 68) that are coupled through a control valve (45) with the process chamber. A feed pump (23) is configured to force fluid through the check valves.

The system disclosed in the cited portion of Constantini can inject fluid chemistry into the process chamber. Injection occurs when heated, high-pressure fluid is released from a heater (e.g. 42) through a check valve (e.g. 67) and through the control valve (45). Opening and closing of the control valve (45) presumably starts and stops injection. [Column 8, lines 16-41.] Thus, any "means for injecting" present in the system described in the cited portion of Constantini that includes "means for stopping the means for injecting" must include the control valve 45 in addition to pressure-providing components upstream from the control valve.

There is no indication within the cited portion of Constantini that the control valve 45 is a one-way valve. Because there is no back-flow prevention device between the control valve 45 and the pressure chamber 37, the system permits bidirecitonal flow through the control valve if it is open. Since the valve is part of the "means for injecting," there is no "means for substantially preventing fluid from reentering the means for injecting" as recited in some claims of the present invention. To anticipate a claim a reference must teach *every* claim element. See MPEP §2131. By failing to show "means for injecting" and "means for substantially preventing fluid from reentering the means for injecting," the cited portion of Constantini fails to anticipate.

Yamagata

The cited portion of Yamagata describes a system for high-pressure processing including high pressure processing chamber (30,31) and "a common chemical liquid supply unit [2A] for supplying the chemical liquid to the each high-pressure processing chambers (*sic*)." [Abstract.] The system includes parallel structures, but only one need be considered to illustrate its basic operation. The system includes a high pressure fluid pump (12) connected through a heater (13) and a valve (14) with the mixer (29). Further, a chemistry supply reservoir (22) is coupled through a chemistry pump (23) and a chemistry valve (27) with the mixer (29). The chemistry and the high pressure fluid freely mix within the delivery line prior to the mixer (29). After the mixer (29), fluid moves through the heater (33) into the processing chamber (31). The patent says that the mixer (29) may be omitted. [Column 8, line 21.]

The system of Yamagata can inject chemistry from various reservoirs (e.g. 10, 20, 22) into the chamber (31). In the exemplary case cited within the office action, the pump 12 produces flow through the valve 15 into the chamber 31. According to Yamagata, the valve 15 is a "high-pressure valve." [Column 7, lines 1-2.] Elsewhere, Yamagata notes that high-pressure valves have an "opening/closing mechanism." [Column 7, line 44.]

Because the valve 15 controls the flow of the chemistry, and hence starts and stops injection, any "means for injecting" present in the system of Yamagata that includes "means for stopping the means for injecting" must include the valve 15. Because the valve 15 is a simple valve, with only an opening/closing mechanism, it permits backward fluid flow when open. None of the components intervening between the valve 15 and the pressure chamber 31 are described as preventing back-flow within the cited portion of Yamagata. Thus, the system of Yamagata includes no "means for substantially preventing fluid from reentering the means for injecting" as recited in some claims of the present invention. To anticipate a claim a reference must teach *every* claim element. See MPEP §2131. By failing to show "means for injecting" and "means for substantially preventing fluid from reentering the means for injecting," the cited portion of Yamagata fails to anticipate.

The Present Invention

Unlike both Yamagata and Constantini, the present invention describes systems and apparatus including "means for injecting a processing chemistry" and "means for substantially preventing fluid from reentering the means for injecting." The "means for injecting" includes "means for starting and means for stopping the means for injecting."

1. 102(e) Rejections

Claims 1, 2, 8, 9-14, 16, 17, 21-26 and 29 stand rejected under 102(e) over both Constantini and Yamagata.

The independent Claim 1 describes an apparatus for use in a system for supercritical processing of an object with a fluid, comprising means for injecting a processing chemistry into the system, including means for starting and means for stopping the means for injecting; and means for substantially preventing fluid from re-entering the means for injecting. By failing to show "means for injecting" and "means for substantially preventing fluid from reentering the means for injecting" as recited in Claim 1, the cited portions of Yamagata and Constantini fail to anticipate Claim 1. For at least these reasons, Claim 1 is allowable over the teachings of Yamagata and Constantini.

Claims 2, 8, and 9-14 depend from Claim 1. As described above, Claim 1 is allowable over the teachings of Yamagata and Constantini. Accordingly, Claims 2, 8, and 9-14 are allowable as being dependent on an allowable base claim.

The independent Claim 16 describes a system for supercritical processing of an object with a fluid. The system comprises a high-pressure process chamber, means for injecting a processing chemistry into the high-pressure process chamber including means for starting and means for stopping the means for injecting, and means for substantially preventing fluid from re-entering the means for injecting. By failing to show "means for injecting" and "means for substantially preventing fluid from reentering the means for injecting" as recited in Claim 16, the cited portions of Yamagata and Constantini fail to anticipate Claim 16. For at least these reasons, Claim 16 is allowable over the teachings of Yamagata and Constantini.

Claims 17, 21-26, 28 and 29 depend from Claim 16. As described above, Claim 16 is allowable over the teachings of Yamagata and Constantini. Accordingly, Claims 17, 21-26, 28 and 29 are allowable as being dependent on an allowable base claim.

2. 103(a) Rejections

Claims 3-5 and 18 stand rejected under 103(a) over both Constantini and Yamagata.

Claims 3-5 depend from Claim 1, Claim 18 depends from Claim 16. As described above, Claims 1 and 16 are allowable over the teachings of Yamagata and Constantini. Accordingly, Claims 3-5 and 8 are allowable as being dependent on an allowable base claim.

B. Rejections over U.S. Patent No. 5,509,431

Within the Office Action, Claim 30 was rejected under 35 U.S.C. §102(b) as being unpatentable over U.S. Patent No. 5,509,431 to Smith Jr. et al. ("Smith").

The cited portion of Smith describes a precision cleaning system including a circulation loop (45, 48, 49) coupled to an inlet line (38, 39, 26) for introducing fluid into the circulation loop. The inlet line includes a control valve 26, a check valve 39 and a pump 38. There is no hint within the cited portion of Smith that the lines upstream and downstream of the pump 38 are configured to maintain a unidirectional flow of fluid in any direction.

Claim 30 describes a supercritical processing system for processing a semiconductor wafer with a fluid, the fluid being from a fluid source. The system comprises a circulation loop coupled to a high-pressure processing chamber, and an inlet line for introducing the fluid into the circulation loop. The inlet line includes an inlet port in the circulation loop, a back-pressure regulator coupled to the inlet port, a pump for compressing the fluid to form a pressurized fluid, a first line for transferring the pressurized fluid from the pump to the back-pressure regulator, the first line configured to maintain a uni-directional flow of the pressurized fluid from the pump towards the back-pressure regulator, and a second line for transferring a quantity of the fluid from the fluid source to the pump, the second line configured to maintain a uni-directional flow of the fluid from the fluid source to the pump. Unlike the present invention, Smith does not teach that either one of the fluid lines surrounding the pump is configured to maintain uni-directional flow of fluid. For at least these reasons, Claim 30 is allowable over the teachings of Smith.

CONCLUSION

In view of the foregoing, Applicant believes all claims now pending in this application are in condition for allowance. The issuance of a formal Notice of Allowance at an early date is respectfully requested. If the Examiner believes that a telephone conference would expedite prosecution of this application, the Examiner is encouraged to contact the undersigned at (408) 530-9700.

Respectfully submitted,
HAVERSTOCK & OWENS LLP

Dated: 8-15-05

By: Thomas B. Haverstock
Thomas B. Haverstock
Reg. No.: 32,571
Attorneys for Applicant

CERTIFICATE OF MAILING (37 CFR§ 1.8(a))

I hereby certify that this paper (along with any referred to as being attached or enclosed) is being deposited with the U.S. Postal Service on the date shown below with sufficient postage as first class mail in an envelope addressed to the: Commissioner for Patents, P.O. Box 1450 Alexandria, VA 22313-1450

HAVERSTOCK & OWENS LLP.

Date: 8-15-05 By: